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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/904,200	07/11/2001	Christopher S. Chen	56252	1223

21874 7590 12/14/2004

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EXAMINER	
NAFF, DAVID M	
ART UNIT	PAPER NUMBER
1651	

DATE MAILED: 12/14/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/904,200	CHEN ET AL.	
	Examiner	Art Unit	
	David M. Naff	1651	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *23 September 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *64-68 and 70-92* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *64-68 and 70-92* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 9/23/04 has been entered.

An amendment submitted with the submission amended claim 64 and canceled claim 69.

Claims examined on the merits are 64-68 and 70-92 which are all claims in the application.

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 64-68 and 7—92 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the

inventor(s), at the time the application was filed, had possession of the claimed invention.

It is unclear where the specification discloses the device containing microfluidic channels that comprise cytophilic and cytophobic regions as claimed in the last two lines of claim 64. The specific page and lines should be pointed out where the claim language appears.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 64-68 and 70-92 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The claims are confusing and unclear in claim 64 as to structure of the device when comprising microfluidic channels that comprise cytophilic and cytophobic regions. It is uncertain where the cytophilic and chtophobic regions are located in relation to the channels or the converse. Additionally, claim 64 is unclear as to the relationship of the microfluidic channels containing cytophilic and cytophobic regions in the last two lines to the previously required polymeric surface having a plurality of cytophilic regions that can adhere a biomolecule and cytophobic regions that do not adhere a

biomolecule and which comprise a surfactant compound. Where are the channels located with respect to the polymeric surface?

Claim Rejections - 35 USC § 103

Claims 64-68 and 70-92 are rejected under 35 U.S.C. 103(a) as being unpatentable over Singhvi et al (6,368,838 B1) in view of Dewez et al (WO 96/15223) and Anderson et al (6,686,184 B1).

The claims are drawn to a device containing a substrate having thereon a plurality of cytophilic regions that can adhere biomolecules and cytophobic regions to which the biomolecules do not adhere, and the cytophobic regions contain a surfactant compound. The substrate comprises a polymeric surface and the device comprises microfluidic channels that comprise cytophilic and cytophobic regions.

Singhvi et al disclose a device having cytophilic islands for adhering cells and cytophobic regions which isolate the cytophilic islands. The cytophilic islands may contain extracellular matrix proteins (col 9, lines 32-33) to promote binding of cells (col 9, lines 22-26).

Dewez et al disclose a biomaterial for selective adhesion of cells or tissue which contains a polymeric support having a heterogeneous surface conditioned with a surfactant and an extracellular matrix protein. The extracellular matrix protein adheres to one surface area of the support and the surfactant adheres to another surface area where it inhibits adsorption of the extracellular matrix protein (paragraph bridging pages 3 and 4). Cells preferentially adhere to the portion of the support containing the extracellular matrix protein (page 4, lines 12-16).

Anderson et al disclose patterning surfaces using a stamp containing microfluidic channels.

It would have been obvious to provide the cytophilic islands of the device of Singhvi et al with extracellular matrix protein to enhance the binding of cells as suggested by Singhvi et al and Dewez et al, and it would have been obvious to provide the cytophobic regions of Singhvi et al with a surfactant to inhibit binding of extracellular matrix protein to these regions as suggested by Dewez et al. It would have further been obvious to provide the device of Singhvi et al with microfluidic channels to obtain the function of these channels in patterning a surface as disclosed by Anderson et al since the device of Singhvi et al can be used for patterning a surface as shown by Figure 1. The conditions of dependent claims would have been matters of obvious choice within the skill of the art in view of the disclosures of the references. The surfactant of Dewez et al can be a polyethylene oxide (page 19, 5). Selecting another known surfactant that provides the same function would have been obvious. The devices of Singhvi et al and Dewez et al can have various forms and shapes and to provide channels as claimed by claims 81 and 82 would have been obvious. As to claims 91 and 92, the surface of Singhvi et al can be made of plastic or polysulfone compounds (col 8, lines 44-45). Polysulfones are hydrophobic. Selecting other polymers that provide the same function would have been obvious.

Response to Arguments

Applicant's arguments filed 9/23/04 have been fully considered but they are not persuasive.

Applicants urge that in Singhvi et al cytophobic regions are created by SAMs, and does not suggest the use of a surfactant to create a cytophobic region. However, it would have been obvious to adsorb a surfactant on a cytophobic SAM in a similar way that Dewez et al adsorb a surfactant on a hydrophobic surface. Moreover, it would have been obvious to use a surfactant to form a cytophobic SAM since Dewez et al disclose (page 5, lines 16-19) that the surfactant can contain a polyethylene oxide group and Singhvi et al disclose that a biophobic SAM can contain a polyethylene glycol group (col 9, line 60).

Applicants urge that Dewez et al use plasma treatment and do not disclose using a surfactant with an untreated surface. However, the surfactant would have been expected to absorb to other surfaces, and groups disclosed by Singhvi et al (col 9) for a SAM forming compound would have been expected to adsorb a surfactant.

Applicants urge that a metal surface is required for SAMS. However, this is not supported by evidence. It appears a polymeric surface can be treated to be functional with SAMS.

As to the microfluidic channels of claim 64, these are suggested by Anderson et al.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David M. Naff whose telephone number is 571-272-0920. The examiner can normally be reached on Monday-Friday 9:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mike Wityshyn can be reached on 571-272-0926. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

David M. Naff
Primary Examiner
Art Unit 1651

DMN
12/13/04